6. ENERGY

6.1 POWER

11th Plan Outlay – Rs. 1178815.16 lac
Annual Plan 2007-08 – Rs . 105700.00 lac

6.1.1 Punjab had turn to Thermal Power Development in the early 70's to meet its demand. The first Thermal Plant established in the State was Guru Nanak Dev Thermal Plant, Bathinda (4x110MW) where four units were commissioned during 1974-79. This was followed by Ropar Thermal Plant (210x6 MW). The first 2 units were commissioned in 1984-85 under Stage –I and Units 3 and 4 were commissioned in 1988-89 and units 5 and 6 were commissioned in 1991-93.

6.1.2 The Achievement during the eighth plan period (1992-97) in respect of addition to generating capacity aggregates to 220 MW. As 210 MW of Ropar Thermal Power Project State-III was commissioned in March 1993 and 10 MW Jalkheri was commissioned in 11/1993. The total installed capacity by the end of eighth plan was 4538 MW including 1267 MW share from common pool Projects of BBMB and 1014 MW share of various central sector projects. Total installed capacity at the end of 9th Plan was 5698 MW. This included 1008 MW from own Hydro Projects, 2130 MW from own Thermal Projects, 1327 MW (as Punjab Share) from BBMB Projects and 1233MW as Punjab Share from Common Pool. The installed capacity by the end of 10th Plan i.e 2006-07 became 6201 MW. This included Punjab share from BBMB of 1258 MW and share from Central Sector 1764 MW. Own Thermal Projects share of 2130 MW and Hydro share (Including PEDA and Co-generation) 1049 MW.

6.1.3 Power plays a vital role in the development of the overall economy of the State. In the State of Punjab, not only the Industrial Sector but the Agriculture sector is also heavily dependent on power. In view of the rising living standard of the people of the State, the demand for power is also increasing day by day. The main objective is to expand and strengthen the Power generation system so that adequate power supply is available on demand to consumers in various sectors of the economy. For this, the strategy for the 11th Five Year Plan will be as under:-

(1) Maximum utilization of existing installed capacity by improving the performance of Thermal Power Stations and Renovation and Modernisation of old Thermal/Hydro power plants.
(2) Expeditious commissioning of new projects.
(3) To initiate advance actions on new schemes to be proposed.

(4) Diversification of source of power Generation-use of gas based thermal plants/biomass based plants and establishing nuclear power plants for Punjab.
(5) Development of Captive Power Plants.
(6) Encouragement of Captive Power Plants and Cogeneration Plants in the State.
(7) Liberalizing setting up of New Renewable Energy Source (NRES) based plants through attractive tariff and other concessions.
(8) Augmenting and Strengthening of the Transmission and Distribution system to supply proper quality of power in both Urban as well as in rural areas.
(9) Reduction of Aggregate Technical and Commercial (AT and C) losses.
(10) Conservation of energy and load management.
(11) Adoption of Information Technology in the Power Sector.

6.1.4 Per capita consumption of electricity in the State has increased from 163 KWH in 1968 to 968 KWH in 31/3/2007 and accordingly electricity consumption has increased from 700 MUs to 27685 MU against the requirement of 36596 MUs, which include transmission and distribution losses. The total installed capacity in 1967-68 was 614 MW, which increased to 6201 MW by the end of March, 2007. All the 12278 inhabited villages in the State of Punjab have already been electrified. At present the number of consumers being served upto March, 2006 are 62.22 lac, which includes general connections 50,90,167 nos, Industrial connections 1,11,578 nos, agriculture connections 97031 nos and others connections 2685 nos in the State. During 2006-07, 20691 General Connection, 505 Industrial Service Connections and 23969 Tubewell Connections have already been released. In order to create employment/self employment opportunities and also to encourage agro based small scale industries in the rural areas, power supply on urban pattern has already been provided to 13119 villages and deras through independent feeders in the state. The total no of grid sub-stations is 646 and length of the transmission and distribution lines is 15350 CKT Kms upto 31/3/2007. The Transmission and Distribution losses which were 30.82% in 1999-2000 have been brought down to 23.91% upto 31/3/2007, which shows overall reduction of about 6.91%.

6.1.5 An outlay of Rs.596365.00 lac has been approved in the 10th Five Year Plan 2002-07 for Power sector, the expenditure incurred during the corresponding period was Rs. 508204.34 lac. In the Annual Plan 2006-07 the expenditure incurred was Rs. 180382.54 lac. Installed capacity of Power as on 31/3/03, is as given below:

(1)	Installed Capacity (Own) (Including Common Pool)	4437 MW
(2)	Share from Central Sector Projects	1764 MW
(3)	Total Installed Capacity	6201MW

(4)	Maximum Demand Met Within 2006-07	6558 MW
(5)	Energy Sent Out	27685 MUs
(6)	Connected Load	20264 MW
(7)	Per Capita Consumption	968 KWH/YR
(8)	Villages Provided Urban Pattern Supply including Deras and Dhanis	13119 Nos
(9)	T and D Losses(Including Commercial) (Tentative)	23.91 %
(10)	No of grid Sub Stations	646 Nos
(11)	Length of Transmission Lines	4601 Km
(12)	Number of 11KV Feeders	7455 Nos
(13)	Length of 11 KV Lines	1,23,332 Ckt KMs
(14)	Number of Distribution Transformers	2,52,165 Nos
(15)	Length of LT Lines	1,73,854 Ckt KMs
(16)	Number of Connections	
	General	50,90,167 Nos
	Industrial	1,11,578 Nos
	Agriculture	9,70,731 Nos
	Others	2,685 Nos

Ongoing Schemes

Centrally Sponsored Schemes

PP-1/ PP 1.12 (A) Transmission and Distribution System (including APDRP)

11th Plan Outlay - Rs. 544544.00 lac
Annual Plan 2007-08 - Rs. 77792.00 lac

6.1.6 Punjab has a vast network of 220 KV, 132 KV, 66 KV, and 33 KV transmission lines and sub stations covering both urban and rural load centres. Similarly, the PSEB has also vast network of distribution lines for supply of power in the State. The status of transmission and distribution system is as under:-

SN	Voltage	Length at the end of 9th Plan	Length at the end of 10th Plan
Transmission Lines			
1	220 KV	3766	4623
2	132 KV	2989	3055
3	66KV	4705	6098
4	33 KV	1653	1574
5	Total	13113	15350

SN	Voltage	Length at the end of 9th Plan	Length at the end of 10th Plan
Grid Sub Stations			
6	220 KV	42	47
7	132 KV	70	76
8	66KV	336	430
9	33 KV	109	93
10	Total	557	646
Distribution Lines			
11	11KV (Ckt Km)	98779	125000
12	LT Lines (Ckt Km)	159513	173500
13	11 KV T/Fs (Nos)	184871	241000

6.1.7 During 11th Plan the stress on the development of transmission and sub transmission system to observe new Power availability in the State. Similarly the distribution system will be brought to he level delivering qualitative supply to ultimate consumer in the State. Even if surplus power is wheeled into the State through open access or by installing IPPs, the inadequacies in the Transmission and Distribution network will be a major handicap in making this surplus power reach the deficit area, particularly to rural pockets.

6.1.8 Under Accelerated Power Development Reforms Programme (APDRP) for strengthening of sub Transmission, Distribution System and Replacement of Metering Equipment, Ministry of Power, Government of India has sanctioned 27 schemes amounting Rs.71757.00 lac which are under execution and are likely to be completed within the next 2-3 years after the release of funds. In addition to this non APDRP System improvement schemes are also under execution. Under the revised funding pattern recommended by the committee, the grant portion would be 50% and remaining would be loan from REC and PFC. Earlier under this programme Government of India was providing 25% grant + 25% loan and the balance 50% funds (of the project cost) was to be contributed by PSEB from internal resources or through availing loans from PFC/REC.

6.1.9 An amount of Rs. 9584.00 lacs of central grant to be given by the Ministry of Power, Government of India under APDRP Programme.

6.1.10 In the 10th Plan, an expenditure incurred was Rs.243224.50 lac. In the Annual Plan 2006-07 the expenditure incurred was Rs.81188.73 lac.

PP-2/PP 1.39 Renovation and Modernisation of GNDTP unit III and IV based on Residual Life Assessment (RLA) study (Phase-II)

11th Plan Outlay - Rs. 60900.00 lac
Annual Plan 2007-08 - Rs. 12565.00 lac

6.1.11 For R and M scheme life extension of Units-II and IV Residual Life Assessment (RLA) study has been carried out and a project report amounting to Rs. 29000.00 lac (at 2002-03 level) on the basis of this study, duly approved by the Board has been submitted to CEA, New Delhi for finalization. In this scheme R and M works on Boiler, Turbine, Instrumentation etc are to be carried out to upgrade the capacity of GNDTP Units-III and IV from 110 MW to 120 MW each. Final memorandum for price negotiation with M/S BHEL have been approved by Board. PO and work Order have been placed upon M/s BHEL on 14/11/2006. Design and Drawing work is in progress. However latest cost of project is Rs. 49000.00 lac at price level of 2006-07. In the 10th Plan, an expenditure incurred was Rs. 8779.07 lac.

PP-3/PP 1.22 GHTP Stage II Lehra Mohabatt (2x250 MW)

11th Plan Outlay - Rs. 143105.00 lac
Annual Plan 2007-08 - Rs. 9321.00 lac

6.1.12 The project envisages setting up of 2 units of 250 MW each adjoining the existing GHTP(Guru Har Gobind Thermal Plant) Stage-I. This project costing Rs. 179000.00 lac is under execution by M/S BHEL in erection, procurement and commissioning mode (EPC). A loan amount of Rs. 161000.00 lac has been tied up with REC Led. Revised estimated cost is likely to be Rs. 213000.00 lac. At present the work at 2x250 MW=500 MW at GHTP Stage-II is in full swing. One unit of 250 MW is expected to be commissioned by September, 2007 and 2nd Unit of 250 MW by December, 2007. In the 10th Plan, an expenditure incurred was Rs.160602.08 lac. In the Annual Plan 2006-07, the expenditure incurred was Rs.76496.46 lac.

PP-4/PP 1.32 (ii) Rajiv Gandhi Gramin Vidyutikaran Yojana (RGGVY)-BNP

11th Plan Outlay - Rs. 11528.00 lac
Annual Plan 2007-08 - Rs. 1650.00 lac

6.1.13 This scheme has a provision for release of 4,04,923 connections to Rural house-holds including 1,48,858 nos to Below Poverty Line (BPL) house-holds. The detailed Project Reports of all the then 17 nos districts of amounting to Rs. 16485.00 lac stand submitted to REC during the year 2005-06. But, only one scheme for Ferozepur District stand sanctioned and in principle, approval to the remaining 16 nos schemes also stands accorded. Now, a letter has been received from the REC that no funds have been allocated against RGGVY scheme to the State of Punjab and as such, works may not be taken in hand.

There are certain pre-requisites attached with the scheme. Out of these, all pre-requisites except, the following stands fulfilled:-

i) Deployment of franchise for revenue collection.
ii) GIS mapping of the area covered under the scheme.

Sincere efforts were made by the PSEB regarding these 2 pre-requisites but these have not been fulfilled so far. Therefore, in order to expeditiously release connections to the Rural house-holds including BPL families, these pre-requisites need to be relaxed. The scheme is yet to be started.

PP-5/PP 1.26 Mukerian Hydro Electric Project-II (18 MW)

11th Plan Outlay - Rs. 10129.20 lac
Annual Plan 2007-08 - Rs. 1447.00 lac

6.1.14 Mukerian Hydel Project Stage-II is situated in Mukerian District Hoshiarpur. The source of water is Beas River and Power House are envisaged on Mukerian Diversion Channel of MHC-I. The estimated cost of the project is Rs. 15000.00 lac. Annual Energy Generation shall be 140.85 Million Units. This project comprises of two portions:-

i) Part-I : Channel Portion :
A new canal called MHC-II having capacity of 11500 cusecs, off taking from RD-35500 m of existing MHC-I about 3.7 Km long.

ii) Part-II : Power House Portion :
A power house of capacity 18 MW (2x9=18MW) is proposed at RD-880m of Mukerian Hydel Channel-II.

6.1.15 The Power House Civil Works were allotted to M/S Parmar Construction Company vide LOI No 3330/CDU-3050 dated 28/11/2003. The work of design, engineering, manufacturing, supply, erection, testing and commissioning and handing over of complete Electrical and Mechanical works on turn-key basis was allotted to M/S BHEL vide Chief Engineer/Hydel LOI dated 29/4/2004. All the civil works have been completed except construction of Main Power House Building. The project was scheduled to be completed by July, 2006. However, due to shifting of site of Power House Building because of water logging problem encountered in the original location at the time of excavation for laying earth mat, the commissioning is likely to be completed during 2008-09. In the 10th Plan, an expenditure incurred was Rs.3882.24 lac. In the Annual Plan 2006-07 the expenditure incurred was Rs.142.34 lac.

PP-6/PP 1.9 Renovation and Modernisation of GGSSTP, Ropar (Phase I and II)

11th Plan Outlay - Rs. 9660.00 lac
Annual Plan 2007-08 - Rs. 1380.00 lac

6.1.16 Guru Gobind Singh Super Thermal Power Plant, Ropar is in operation for the past about 20 year. Due to continuous running of plant and up-gradation of technology certain R and M activities were planed to be executed so as to improve the efficiencies, PLF and availability factor of Plant. The total cost of the R and M works involving all 6 units is approximately Rs. 56800.00 lac and work is planned to be completed during 11th Five Year Plan through 13 nos schemes already formulated. The work is planned to be completed by end of 11th Plan. In the 10th Plan, an expenditure incurred was Rs.8779.07 lac In the Annual Plan 2006-07, the expenditure incurred was Rs.834.08 lac.

PP-7/PP 1.31: Renovation and Modernisation work at Thermal Plants as per Residual Life Assessment (RLA) Study of GNDTP Bathinda (Unit I and II)

11th Plan Outlay - Rs. 8400.00 lac
Annual Plan 2007-08 - Rs. 1200.00 lac

6.1.17 All four units of Guru Nanak Dev Thermal Plant have almost completed their useful designed life. Residual Life Assessment study was conducted on unit-II with the objective of restoring the rated capacity, improving efficiency and to refurnishing the units to extend their life by 15 years. A Project Report of R and M works based on RLA study was framed and the total cost of the scheme is approximately Rs. 22900.00 lac. Loan has been tied up with PFC. In this scheme Rand M works on Boiler, Turbine, Instrumentation etc are to be carried out to restore the capacity (110 MW) of GNDTP Units. Work of unit-II completed and has been commissioned in 10/2005 after R and M works. Work on unit-I is in progress which is likely to be completed shortly. In the 10th Plan, an expenditure incurred was Rs.17794.91 lac.

PP-8/PP1.10 Renovation and Modernization of Bhakra PHs and Associated works.

11th Plan Outlay - Rs. 1610.00 lac
Annual Plan 2007-08 - Rs. 230.00 lac

6.1.18 BBMB is carrying out Renovation, Modernization and up rating of the following Power Houses in the State. The total cost of these projects is Rs.77194.00 lac and the State share is Rs.36585.00 lac.

(i) Bhakra Right Bank Power House

6.1.19 5 units with a capacity of 132 MW each are to be up rated to 157 MW each. All the units have already been up-rated. This scheme has provided a additional power of 125 MW against which PSEB is getting 63.6 MW additional installed capacity. The total cost is Rs.8844.00 lac and share of Punjab is Rs.4239.00 lac.

(ii) PONG Power House

6.1.20 Six machines of 60 MW each at Pong Power Plant (6x60 MW) were commissioned from 1978 to 1983. On the recommendations of BHEL the up rating of all six machines of Pong Power Plant by 10% was planned. Initially up rating and modernization of only one machine from 60MW to 66 MW was planned and after observing its performance, the up rating and modernization of the remaining five machines were to be undertaken. The work of remaining two units (Unit No.5 and 6) has also been undertaken in 2002-03. Unit nos 5 has already been commissioned on 25.1.2003 and Unit nos 6 is scheduled to be commissioned on 31.3.2004. The revised estimated cost of the scheme is Rs.1770.00 lac out of which PSEB share shall be 440.00 lac against the original cost of Rs.757.00 lac (PSEB share 188.00 lac). This will provide additional peaking capacity of 36MW and additional generation of 17 MU and additional reactive power of 90 MVAR by replacing poles of rotor and improving the cooling system.

(iii) Ganguwal and Kotla Power Houses Phase-III

6.1.21 The installed capacity of these Power Houses is 83.58 MW and 84.57 MW. BBMB is contemplating Renovation, Modernization and uprating of these units at Ganguwal and Kotla under Phase-I, II and III. Feasibility studies in this regard are under process. The scheme is estimated to cost Rs.17780.00 lac out of which PSEB's share will be Rs.8517.00 lac and shall result in an additional generation capacity of about 4.44 MW besides extra annual generation of 36.23 MUs equivalent to about Rs.861.00 lac of revenue to partner States. PFC has sanctioned a loan of Rs.3422.00 lac for the above scheme which is under consideration of the Board for availing loan on terms and conditions of Power Financial Corporation. (The total also includes the cost of phase-I and II i.e. Rs.8780.00 lac and state share Rs.4204.00 lac).

(iv) Bhakra Left Bank Power House

6.1.22 All the 5 units of Bhakra Right Bank have been up-rated from 132 MW each to 157 MW each giving an additional power of 125 MW against which PSEB will be getting 63.6 MW of the additional installed capacity. 5 No. of Units of Bhakra Left Bank Power House of 90 MW capacity each were commissioned during 1960-61. The units were however up-rated to 108 MW each by changing the stator winding having class-B (bitumen mica insulation) with Class-F insulation during the period 1980-85 enabling use of high cross-section of copper in some slots. Since these machines have already outlived their useful life and are also experiencing fall in turbine efficiency, the machines are thus due for carrying out RM and U works. The jobs of R M and U klis provided to be taken in the years from 2003-04 to 2011-12 at an estimated cost of Rs. 488.00 lac out of which PSEB share will be Rs. 23400.00 lac. With the upgrading of 5 units of 108 MW each to 126 MW, it is estimated to have an extra-generation of 90MU, equivalent to approximately annual revenue of

Rs.21.00 lac to the partner States. Work for the above scheme is started during the 2004-05. For the renovation, modernization and uprating of the above BMB power Houses.

6.1.23 In the 10th Plan , an expenditure incurred was Rs.4266.93 lac In the Annual Plan 2006-07,the expenditure incurred was Rs.2390.71 lac.

PP-9/PP 1.7 Shahpur Kandi Dam Hydro Electric Project (168 MW).

11th Plan Outlay - Rs. 388909.16 lac
Annual Plan 2007-08 - Rs. 115.00 lac

6.1.24 The Shahpur Kandi Project is a sister concerned project of Ranjit Sagar Dam Project (which is now completed). The construction of Shahpur kandi Dam Project is essential to get the optimum benefits of Power and irrigation potential created by Ranjit Sagar Dam Project. The proposed Dam is situated on the river Ravi, down stream of the Ranjit Sagar Dam and 8 Km. upstream of the Madhopur Head Works. The concrete dam is flanked by two Head Regulators on its Right and Left abutments falling in Jand and Punjab. The cost of this project at Sept. 2005 price level was estimated at Rs.194500.00 lac at September, 2005 price index. An expenditure of Rs. 1.43 lac has already been incurred upto March, 2006 on acquisition of land, preliminary design, investigation, development of infrastructural works, excavation of main dam, benches, left side head regulator, Hydel Channel and concreting of left side head regulator. The remaining funds of Rs. 177000.00 lac are required as follows:-

(Rs Crore)

Plan	**Year**	**Funds required**		**Irrigation Share @ 12.61 %**	**PSEB Share @87.39%**	**Total**
		Works	Estt.			
10th Five Year Plan	2006-07	25	7	4.04	27.96	32.00
Total		**25**	**7**	**4.04**	**27.96**	**32.00**
11th Five Year Plan	2007-08	421	34	57.38	397.62	455.00
	2008-09	365	35	50.44	349.56	400.00
	2009-10	324	41	46.03	318.97	365.00
	2010-11	275	40	39.72	275.28	315.00
	2011-12	163	40	25.60	177.40	203.00
Total		**1573**	**197**	**223.21**	**1546.79**	**1770.00**

6.1.25 Out of the total financial requirement, 12.61% shall be borne by Government of Punjab and the remaining 87.39% shall be provided by Punjab State Electricity Board by arranging loan from PFC/REC/other agencies.

6.2 NON CONVENTIONAL SOURCES OF ENERGY

11th Plan Outlay - Rs. 114950.00 lac
Annual Plan 2007-08 Outlay – Rs. 297.00 lac

6.2.1 The major portion of the country's energy requirement is met from conventional energy sources like coal and petroleum. However, the vast majority of our rural population still depends upon the locally available non-conventional sources of energy like animal dug, crop waste and fuel wood. In order to ensure the efficient use of these energy resources in an environmental friendly manner, it is important to promote the programmes of Non-Conventional Sources of Energy.

6.2.2 The State of Punjab does not have mineral resources of energy such as coal, oil and gas and is located far from such resources. Punjab has also almost exhausted its hydel potential for generating power for meeting its ever increasing power requirements in the agricultural, domestic and industrial sectors. However, Punjab has in abundance, biomass / agro-residue and solar energy resources which are yet to be exploited for power generation. The State Govt. has established the Punjab Energy Development Agency (PEDA) for initiating the innovative use of solar, bio gas and other non-conventional sources of energy and to suggest the means for conserving energy. Against the approved outlay of Rs 1908.00 lac, an expenditure of Rs 1197.76 lac has been incurred during the 10th Plan. An outlay of Rs 114950.00 lac has been provided for the 11th Plan and Rs 297.00 lac for the Annual Plan 2007-08.

On Going Schemes

Centrally Sponsored Schmes

NC 1/NC1.10 Power Generation from Agro Waste (90:10) (JBIC:SS)

11thPlan Outlay - Rs. 45000.00 lac
Annual Plan 2007-08 Outlay - Rs. 1.00 lac

6.2.3 The main aim of this scheme is to identify and commercialize the technology for most efficient conversion of agro waste into energy. Punjab is abundant in bio-mass. In the state of Punjab, agriculture biomass/agro residue/ crop-waste available all round the year which can be used for power generation with estimated potential of 1000 MW. Most agriculture residue is being burnt in the fields. Amongst the various alternative sources of energy, recovery of energy from agro waste is becoming a very cost effective option. Various technologies are being used for power generation from agro waste.

6.2.4 In order to harness the available potential in this sector, during the 11th Plan period (2007-12), PEDA proposes to set up 10 such biomass power projects in 10 tehsils of the state which have already been identified.

Preliminary project proposal for the same has already been prepared and submitted for soft loan funding to Japan Govt. through Deptt. of Economic Affairs, Ministry of Finance, Govt. of India. This project has already been made of the rolling Plan for 2006 for seeking assistance under Overseas Development Assistance Programme of Japan govt. through Japan Bank for International Cooperation (JBIC). The JBIC pre fact finding mission has already visited PEDA in July, 06 for assessing these projects. As a out come of discussion with JBIC mission, Detailed Project Reports for these 10 biomass power plants are now required to be prepared. This project shall bring in the following benefits:-

(1) Utilisation for different Agro residue resources available in the state for power generation
(2) Additional Capacity Generation of 100MW power
(3) Demonstration of New environment friendly and clean technologies for power generation.

As per the DPR prepared, the means of finance and the project which is to be implemented in 2007-12 is as under:-

(1)	Total Project cost	-	Rs.45000.00 lac
(2)	JBIC ODA Loan	-	Rs.40500.00 lac (90%)
(3)	State Govt. Share	-	Rs.4500.00 lac (10%)

6.2.5 The setting up of these biomass/agro residue power generation projects is in accordance with the objectives and guidelines of State Renewable Energy Policy 2001. This project shall utilize a mix of agro residues such as rice husk, biogases and rice straw, cotton and arhar stalks etc. The project operations shall be commercially viable with the estimated break- even being achieved in 4-5 years due to the expected ODA soft loan from JBIC.

6.2.6 An outlay of Rs.45000.00 lac has been provided for the 11th Five Year Plan. Since the project has not yet been approved, a token provision of Rs 1.00 lac has been provided for the annual plan 2007-08.

NC 2/NC 1.12 Mini/Micro Hydel Projects (70:20:10) (JBIC:CS:SS)

11th Plan Outlay - Rs. 42200.00 lac
Annual Plan 2007-08 Outlay - Rs. 1.00 lac

6.2.7 Punjab Energy Development Agency (PEDA) is setting up 8 Mini Micro Hydel Projects, 4 each on Abohar and Bathinda Branch Canal respectively. The Abohar Canal Project which was being funded by the World Bank assistance at Dalla, Narangwal, Tugal and Chupki has already been completed with an estimated cost of Rs. 2919.00 lac. PEDA has also completed 4 mini Hydel Projects on Bathinda Branch Canal with a total Power potential of 4.3 MW with an estimated cost of Rs. 3150.00 lac. PEDA has also taken a lead

in the country by setting up 8 Nos technology demonstration/ Mini Micro Hydel Power Projects having total cap. of 9.8 MW PEDA has also attracted private sector participation for such projects. 55 such projects have already been allocated to private developers with a total cap of 40 MW 10 such projects with a total capacity of 11 MW through private companies have also been commissioned on 'Built Own and Operate" basis.

6.2.8 In order to harness the available potential in the State during the 11th Five Year Plan, PEDA has planned to set up 9 small hydro power projects with installed capacity 35 MW on Bhakra Main Canal and 16 MW on UBDC canal system with international soft loan financial support (@ 1.3%) from Japan Government through Japan Bank for International Cooperation (JBIC). The preliminary Project report for these projects has already been submitted to JBIC through Deptt. of Economic Affairs, Ministry of Finance, Govt. of India for availing this soft loan which will be paid back over a period of 30 years, with 10 years moratorium. The pre-fact finding mission of JBIC has also had a meeting with PEDA at Chandigarh and visited the existing working projects and some of the proposed sites during July 2006. Accordingly, this project has been planned to be executed through the following means of finance:-

(1)	Total Project Cost	-	Rs.42200.00 lac
(2)	MNES, Govt. of India grant	-	Rs.8440.00 lac (20%)
(3)	State Govt.	-	Rs.4220.00 lac (10%)
(4)	JBIC Loan	-	Rs.29540.00 lac (70%)

6.2.9 An outlay of Rs. 42200.00 lac has been provided in the 11th Plan for the Small/Mini Hydro Power Projects. Since the project has not yet been approved, a token provision of Rs. 1.00 lac has been provided for the Annual Plan 2007-08

NC 3/NC 1.13 Solar Photovoltaic Demonstration Programme in Punjab. (50:15:35) (CS:SS:Ben)

11th Plan Outlay - Rs. 500.00 lac
Annual Plan 2007-08 Outlay - Rs.95.00 lac

6.2.10 Solar Photovoltaic (SPV) Technology converts sunlight directly and instantaneously into DC Electricity in an environmentally clean and reliable manner. Under this programme solar lanterns, SPV Water pumping system, SPV Street Lighting systems, domestic lighting systems, etc are being installed. The funding pattern of this scheme is 15% by the State, 50% by the Central Govt. as loan and 35% as the beneficiary share. Against the approved outlay of Rs 200.00 lac, an expenditure of Rs 20.00 lac has been incurred during 10th Plan. An outlay of Rs. 500.00 lac has been provided for 11th Five Year Plan and Rs.95.00 lac for Annual Plan 2007-08.

NC 4/NC 1.13 (ii) Solar Power Generation (50:50) (CS:SS)

11th Plan Outlay - Rs. 25000.00 lac
Annual Plan 2007-08 Outlay - Rs. 50.00 lac

6.2.11 Punjab has more than 300 sunny days and thus unlimited potential of this environment friendly resources of solar energy. This resources needs to be harnessed thorough setting up of large demonstration project based on solar photovoltaic and solar thermal technologies. SPV technologies is still very cost intensive and solar thermal technology is comparatively cheaper. PEDA set up 200 KW SPV Grid Interactive Power Plant at village Khatkar Kalan, Nawanshehar at a cost of Rs.48000.00 lac with central grant of Rs.28500.00 lac. An amount of Rs.130.00 lac has been approved for the 10th Plan, which has been utilized.

6.2.12 In order to harness the abundantly available, PEDA plans to set up a 50 MW, Solar thermal power generation plant in the state. This will be grid interactive project and shall be connected to a PSEB sub station for export of solar power into the rural grid and also provide voltage support and power factor improvement. This project will be based on solar through collectors technology which shall generate power through solar thermal energy route. The plant will have less operation and maintenance costs and no fuel requirements, when compared to conventional coal based thermal power station. This will be a prestigious pilot project which shall be undertaken in joint technical collaboration with the technology providing company. The project shall support the objective of environment friendly and sustainable energy resources use for power generation from solar energy in the State. During 2007-08, technical feasibility report for the project will be prepared.

6.2.13 Under this scheme, an outlay of Rs 25000.00 lac has been provided for 11th Five Year Plan and Rs.50.00 lac for Annual Plan 2007-08.

NC 5/ NC 1.16 Energy Recovery from Urban Municipal Industrial Waste (20:80) (CS:SS)

11th Plan Outlay - Rs. 2000.00 lac
Annual Plan 2007-08 Outlay - Rs. 100.00 lac

6.2.14 This project aims at promotion, development, demonstration and adoption of conversion technologies for both liquid and solid waste to serve as means of improvement of waste management. There is approximately 1.00 lac cattle population and the total cow dung generated is approximately 1000 tonnes. Haebowal dairy complex Ludhiana has been set up under UNDP/GEF programme. This project is utilizing approximately 234 tonnes cattle waste to generate 1 MW Power which is being injected into the PSEB grid. Against the approved outlay of Rs 400.00 lac, an expenditure of Rs 410.00 lac has been incurred during 10th Plan.

6.2.15 During the 11th Five Year Plan, PEDA plans to setup 2 projects in two cities i.e. Ludhiana and Amritsar with the financial assistance of MNRE,GOI. These two projects shall be setup based on cattle dung. The means of financing of these projects are as under:-

MNRE/GOI	20%
State Govt.	80%

6.2.16 An outlay of Rs. 2000.00 lac has been provided for 11th Five Year Plan and Rs. 100.00 lac for Annual Plan 2007-08.

New Schemes
State Funded Schemes
NC 6 Implementation of Energy Conservation Act 2001

11th Plan Outlay - Rs. 250.00 lac
Annual Plan 2007-08 Outlay - Rs. 50.00 lac

6.2.17 This is a new scheme. Govt. of India enacted the Energy Conservation Act, 2001 which came into force from March, 2002 State Govt. has declared PEDA as designated agency to coordinate monitor and enforce Energy Conservation Act, 2001 in the State. In order to achieve the objectives envisaged in NRSE Policy 2001 and to popularize the concept of Energy Conservation Act, 2001 to prepare Strategic Action Plan Document for the State constitution of State Energy Conservation Awards and implement Energy Conservation Programme in building, Energy Conservation and Energy Efficiency Improvement Programmes in industry, transport, agriculture, domestic and commercial sector. Activities such as Mass Awareness Programmes through print and electronic media, seminar/workshops for promoting energy conservation measures in all these sectors shall also taken up during the 11th Plan period.

6.2.18 As per the Energy Conservation Act, 2001, there is a provision of establishment of Fund by the State Govt. in the following manner:-

(1) The State Govt. shall constitute a fund to be called the State Energy Conservation Fund for the purposes of efficient use of energy and its conservation with the State.
(2) To the Fund shall be credited all grants and loans that may be made by the State Government or, Central Govt. or any other organization or individual for the purposes of this Act.
(3) The Fund shall be applied for meeting the expenses incurred for implementation the provisions of this Act.

(4) The Fund created under such manner as may be specified in the rules made by the State Government.

6.2.19 Under this scheme, an outlay of Rs 250.00 lac has been provided for 11th Five Year Plan and Rs.50.00 lac for Annual Plan 2007-08.

6.3 INTEGRATED RURAL ENERGY PROGRAMME

RE 1/RE 1.1 Implementation of IREP Activities (50:50)

11th Plan Outlay - Rs. 1100.00 lac
Annual Plan 2007-08 Outlay - Rs. 205.00 lac

6.3.1 This scheme was sponsored by the Planning Commission G.O.I. in the 6th Five Year Plan and the scheme was introduced in Punjab by adopting two Blocks and extended to 40 blocks of the State up to 9th Five Year Plan. This scheme was funded through two components i.e. Central Component MNES (salary of the staff working under IREP) and State component. Under State component, New Renewable Sources of Energy devices were provided. As per the Guidelines of the Planning Commission, the salary of the staff has been provided under CSS for promoting the NRSE devices/systems in the state. Against the approved outlay of Rs 1600.00 lac, an expenditure of Rs 595.00 lac has been incurred as State share during 10th Plan.

6.3.2 This scheme is being implemented in all the districts of the State by selecting cluster of villages. IREP scheme is being funded through 50% matching grant from Central Government.

6.3.3 Under Central Component, Govt. of India through Ministry of Non-Conventional Energy Sources (MNES) is providing funds for implementation of state level, district level and clustral level energy conservation activities and demonstration new energy devices and partially support for administrative, extension, training and miscellaneous activities of IREP staff. Under State Component, State Govt. has adopted this scheme for implementation of energy plans through promotion and installation of NRSE and Energy Conservation devices, etc for meeting energy needs of the rural people. The main objectives of the scheme are:-

(1) To provide minimum domestic energy needs for cooking and lighting by providing solar energy devices to the rural people and saving of energy.
(2) Providing of electricity saving devices such as CFL, low voltage slim tube set, etc for saving electricity in lighting.
(3) To provide most cost effective mix of various energy sources and options for meeting requirements of sustainable agriculture and rural development with due environmental consideration.

(4) Propagation & promotion of energy saving devices to the rural people with a view to save at least 10% energy/electricity.

6.3.4 Under this scheme, SPV Lanterns, Solar Cookers, Solar domestic Home Lighting Systems, energy efficient compact fluorescent lamps and Solar Water Pumping System will be provided to the beneficiaries, by providing state incentive. For this purpose, an outlay of Rs 1100.00 lac (State share) has been provided for 11th Five Year Plan and Rs 205.00 lac (State share) for Annual Plan 2007-08.

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